Dr. Shannon Quinn

Curriculum Vitæ

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Assistant Professor
Departments of Computer Science and Cellular Biology
University of Georgia

Education

2010–2014 **PhD in Computational Biology**, *Joint Carnegie Mellon-University of Pittsburgh Ph.D. Program in Computational Biology*, Pittsburgh.
Dissertation topic: *Distributed Spectral Graph Methods for Analyzing Large-Scale Unstructured Biomedical Data*, advised by Prof. Chakra Chennubhotla. Defended November 2014.

2008–2010 **MS in Computational Biology**, *Carnegie Mellon University*, Pittsburgh.
Dissertation topic: *Waldo: A Framework for Inferring Protein Location as a Function of Condition*, advised by Prof. Robert F. Murphy. Defended May 2010.

2003–2008 **BS in Computer Science**, *Georgia Institute of Technology*, Atlanta.
Specializations in software engineering, networking, operating systems, databases, and security.

Objectives and Highlights

Scalable & Translational Biomedical Imaging.
My lab implements scalable and parallel biomedical image analysis frameworks ("big imaging") to elucidate dynamics of cell- and tissue-level systems: deep convolutional networks for identifying ciliary motion phenotypes; social network analysis to differentiate mitochondrial protein patterns; optical flow-based motion tracking for motility analysis of *Toxoplasma gondii* parasites; distributed dictionary learning to locate functional networks of neurons in fMRI data. Each project has the two-fold goal of establishing quantitative models of system dynamics, and providing useful analytics packages to domain experts.

Public Health Surveillance.
My lab devises large-scale natural language processing and image processing algorithms to monitor, predict, and model disease outbreaks and other threats to public health using a combination of "traditional" (e.g. governmental) and "non-traditional" (e.g. social media) data sources. We aim to provide public health officials with real-time disease monitoring and hotspot predictions, enabling the efficient allocation of resources to minimize outbreak severity.

Experiential & Interdisciplinary Data Science.
My teaching pedagogy focuses on applied, experiential, and interdisciplinary data science. I developed five new courses across two departments in my first year at the University of Georgia, ranging from introductory to advanced graduate-level practica, all with the objective of equipping the next generation of scientists and industry professionals for quantitative and interdisciplinary roles. Tools such as scientific notebooks, autograders, and leaderboards are used to maximize hands-on experience; techniques such as flipped classrooms and "fake news lectures" are used to encourage student engagement and critical thinking. All course materials are open sourced in the "Experiential Data Science @ UGA" GitHub organization.

Open Science.
Every course I instruct includes at least one lecture on the principles of Open Science; everyone associated with my research lab engages in Open Science practices. To help catalyze the cultural shift that is needed for widespread adoption of these principles, I chair an annual Open Science in Big Data workshop to explore strategies and current practices. Additionally, we have contributed to several open source projects, including `scikit-learn`, *Apache Flink*, *Apache Spark*, and the *Apache Mahout-Samsara* project, for which I am a committer. Finally, all our research artifacts are released under permissive open source licenses in the "Quinn Research Group" GitHub organization.

Publications

2020 Mojtaba Fazli, Marcus Hill, Andrew Durden, Rachel Mattson, Chakra Chennubhotla, Allyson Loy, Barbara Reaves, Abigail Courtney, Frederick Quinn, **Shannon Quinn**; "OrNet: A Python Toolkit to Model the Diffuse Structure of Organelles as Social Networks", *Journal of Open Source Software (JOSS)*.

2019 Mojtaba Fazli, Rachel Stadler, Bahaa AlAila, Stephen Vella, Silvia Moreno, Gary Ward, **Shannon Quinn**; "Lightweight and Scalable Particle Tracking and Motion Clustering of 3D Cell Trajectories", *IEEE DSAA*.

Christian McDaniel, **Shannon Quinn**; "GCNeuro: A Graph Convolutional Network Pipeline for Preprocessing and Analyzing Multimodal Neuroimage Data", *SciPy*.

Rajeswari Sivakumar, **Shannon Quinn**; "Parkinson's Classification and Feature Extraction from Diffusion Tensor Images", *SciPy*.

(preprint) Roi Ceren, **Shannon Quinn**, Glen Rains; "Towards a Decentralized, Autonomous Multiagent Framework for Mitigating Crop Loss".

2018 Mojtaba Fazli, Stephen Vella, Silvia Moreno, Gary Ward, **Shannon Quinn**; "Toward Simple & Scalable 3D Cell Tracking", *IEEE BigData*, OSBD Workshop.

Christian McDaniel, **Shannon Quinn**; "Developing an LSTM Pipeline for Accelerometer Data", *SciPy*.

Andrew Durden, Allyson T. Loy, Barbara Reaves, Mojtaba Fazli, Abigail Courtney, Frederick D. Quinn, S. C. Chennubhotla, **Shannon Quinn**; "Dynamic Social Network Modeling of Diffuse Subcellular Morphologies", *SciPy*.

Charles Lu, Maurice Marx, Chakra Chennubhotla, Maliha Zahid, Cecilia Lo, **Shannon Quinn**; "Stacked Neural Networks for Automated Ciliary Motion Analysis", *IEEE ISBI*.

Narita Pandhe, Balazs Rada, **Shannon Quinn**; "Generative Spatiotemporal Modeling of Neutrophil Behavior", *IEEE ISBI*.

Mojtaba Fazli, Stephen Vella, Silvia Moreno, **Shannon Quinn**; "Unsupervised Discovery of *Toxoplasma gondii* Motility Phenotypes", *IEEE ISBI*.

Milad Makkie, Xiang Li, **Shannon Quinn**, Binbin Lin, Jieping Yi, Geoffrey Mon, and Tianming Liu; "A Distributed Computing Platform for fMRI Big Data Analytics", *IEEE Transactions on Big Data*.

2017 Walid Shalaby, BahaaEddin AlAila, Mohammed Korayem, Layla Pournajaf, Khalifeh Aljadda, **Shannon Quinn**, and Wlodek Zadrozny; "Help Me Find a Job: A Graph-based Approach for Job Recommendation at Scale", *IEEE BigData*.

Mojtaba Fazli, Stephen Vella, Silvia Moreno, **Shannon Quinn**; "Computational Motility Tracking of Calcium Dynamics in *Toxoplasma gondii*", *ACM SIGKDD*, Bigdas Workshop.

Charles Lu, **Shannon Quinn**; "Classification of Ciliary Motion with 3D Convolutional Neural Networks", *ACM Southeastern Conference*.

Yu Zhao, Xiang Li, Milad Makkie, **Shannon Quinn**, Binbin Lin, Jieping Ye, and Tianming Liu; "Template-guided Functional Network Identification via Supervised Dictionary Learning", *IEEE ISBI*.

Brittany Norman, Daniel Hirsh, Tod Davis, Robert Massey, **Shannon Quinn**; "Automated Identification of Pediatric Appendicitis Score in Emergency Department Notes using Natural Language Processing", *IEEE BHI*.

2016 Geoffrey Mon, Milad Makkie, Xiang Li, Tianming Liu, **Shannon Quinn**; "Implementing Dictionary Learning in Apache Flink, Or: How I Learned to Relax and Love Iterations", *IEEE BigData* (acceptance rate: 18.7%), OSBD Workshop.

Milad Makkie, Xiang Li, Binbin Lin, Jieping Ye, Tianming Liu, **Shannon Quinn**; "Distributed Rank-1 Dictionary Learning: Towards Fast and Scalable Solutions for fMRI Big Data Analytics", *IEEE BigData* (acceptance rate: 18.7%), KDDBHI Workshop.

Sebastian Schelter, Andrew Palumbo, **Shannon Quinn**, Suneel Marthi, Andrew Musselman; "Samsara: Declarative Machine Learning on Distributed Dataflow Systems", *NIPS*, ML Systems Workshop.

Payel Sil, Craig Hayes, Barbara Reaves, Patrick Breen, **Shannon Quinn**, Jeremy Sokolove, and Balázs Rada; "P2Y6 receptor antagonist, MRS2578, inhibits neutrophil activation and aggregated NET formation induced by gout-associated monosodium urate crystals", *Journal of Immunology*.

Patrick Breen, Jane Kelly, Tim Heckman, **Shannon Quinn**; "Mining Pre-Exposure Prophylaxis Trends in Social Media", *IEEE DSAA* (acceptance rate: 20.2%).

(invited) John Miller, Casey Bowman, Vishnu Gowda Harish, **Shannon Quinn**; "Open Source Big Data Analytics Frameworks Written in Scala", *IEEE BigData Congress*.

Xiang Li, Milad Makkie, Binbin Lin, Mojtaba Sedigh Fazli, Ian Davidson, Jieping Ye, Tianming Liu, **Shannon Quinn**; "Scalable Fast Rank-1 Dictionary Learning for fMRI Big Data Analysis", *ACM SIGKDD*.

Shannon Quinn, Arvind Ramanathan, Laura Pullum, and Chad Steed; "Dr. Twitter: The Logistics of Practical Disease Surveillance using Social Media", *IEEE EMBS BHI*.

Arvind Ramanathan, **Shannon Quinn**, Laura Pullum, and Chad Steed; "Tracking Alcohol and Marijuana Usage and Behaviors from Social Media using Oak Ridge Bio-Surveillance Toolkit", *IEEE EMBS BHI*.

2015 Arvind Ramanathan, Laura L. Pullum, T. Hobson, C. Stahl, Chad A. Steed, **Shannon Quinn**, and Chakra Chennubhotla; "Discovering Multi-scale Co-occurrence Patterns of Asthma and Influenza with the Oak Ridge Bio-surveillance Toolkit", *Frontiers in Public Health*.

Shannon Quinn, Maliha Zahid, John Durkin, Richard Francis, Cecilia W. Lo, and Chakra Chennubhotla; "Automated identification of abnormal respiratory ciliary motion in nasal biopsies", *Science Translational Medicine*.

Arvind Ramanathan, Laura L. Pullum, T. Hobson, Chad A. Steed, **Shannon Quinn**, Chakra Chennubhotla, and Silvia Valkova; "ORBiT: Oak Ridge biosurveillance toolkit for public health dynamics", *BMC Bioinformatics*.

2013 Arvind Ramanathan, Larua L. Pullum, Chad A. Steed, **Shannon Quinn**, Tara L. Parker, and Chakra S. Chennubhotla; "Integrating Heterogeneous Healthcare Datasets and Visual Analytics for Disease Bio-Surveillance and Dynamics", *IEEE Workshop on Interactive Visual Text Analytics*, IEEE VIS.

Arvind Ramanathan, Laura L. Pullum, Chad A. Steed, Tara L. Parker, **Shannon Quinn**, and Chakra S. Chennubhotla; "Oak Ridge Bio-Surveillance Toolkit (ORBiT): Integrating Big-Data Analytics with Visual Analysis for Public Health Dynamics", *Public Health's Wicked Problems: Can InfoVis Save Lives?*, IEEE VIS.

2012 Arvind Ramanathan, Andrej Savol, Virginia Burger, **Shannon Quinn**, Pratul K. Agarwal, and Chakra Chennubhotla; "Statistical inference for big data problems in molecular biophysics", *Advances in Neural Information Processing Systems*, Workshop on Parallel and Large Scale Machine Learning.

2011 **Shannon Quinn**, Richard Francis, Cecilia W. Lo, and Chakra Chennubhotla; "Novel use of differential image velocity invariants to categorize ciliary motion defects", *Biomedical Sciences and Engineering Conference (BSEC)*, IEEE.

2010 **Shannon Quinn**, Aarti Singh, Hagit Shatkay, and Robert F. Murphy; "A framework for inferring protein location as a function of condition", Technical report, School of Computer Science, Lane Center for Computational Biology, Carnegie Mellon University, May 2010 (master's thesis).

Aabid Shariff, Joshua Kangas, Luis Pedro Coelho, **Shannon Quinn**, and Robert F. Murphy; "Automated Image Analysis for High Content Screening and Analysis", *Journal Biomolecular Screening*, 15(7):726-734, 2010.

Luis Pedro Coelho, Estelle Glory-Afshar, Joshua Kangas, **Shannon Quinn**, Aabid Shariff, and Robert F. Murphy; "Principles of Bioimage Informatics: Focus on machine learning of cell patterns", *Lecture Notes in Computer Science*.

Posters and Talks

2019 (invited) **Speaker**, *University of Pittsburgh Medical Center*, "CiliaWeb: A quantitative measure of ciliary motion for translational biomedicine", University of Pittsburgh, Pittsburgh, PA.

Poster, *CTL Faculty Teaching Celebration*, "Teaching ethical data science through real-world re-enactment", University of Georgia, Athens, GA.

(invited) **Speaker**, *UGA Infectious Diseases*, "Parameterizing Spatiotemporal Dynamics of Biological Systems with Images (Or: How I Learned to Relax and Love Visual Change)", University of Georgia, Athens, GA.

Poster, *Southern Big Data Hub: All Hands*, "Scalable 3D Tracking and Clustering of *Toxoplasma gondii* Motion Phenotypes", Georgia Institute of Technology, Atlanta, GA.

2018 **Poster**, *Southern Data Science Conference*, "Dynamic Social Network Modeling of Diffuse Subcellular Morphologies", Atlanta, GA.

Poster, *Southern Data Science Conference*, "Modeling the Motion of *Toxoplasma gondii*", Atlanta, GA.

(invited) **Speaker**, *Jupyter Day*, "Reproducible Segmentation of Not-Quite-Objects in Jupyter Notebooks", Atlanta, GA.
Materials

(invited) **Speaker**, *UGA ACM*, "UGA ACM Faculty Spotlight Talk: Python for Biomedical Imaging", University of Georgia, Athens, GA.
Materials

2017 **Poster**, *ACM SIGKDD Bigdas Workshop*, "Computational Motility Tracking of Calcium Dynamics in *Toxoplasma gondii*", Halifax, Canada.

(invited) **Speaker**, *PyDataATL*, "Python for Public Health: Case Studies in Bioimaging", Atlanta, GA.

Poster, *Computer Science Research Day*, "Developing motion models of *Toxoplasma gondii*", University of Georgia, Athens, GA.
M. Fazli, S. Vella, S. Moreno, **S. Quinn**

(invited) **Speaker**, *Southern Data Science Conference*, "Python for Public Health: Case Studies in Bioimaging", Atlanta, GA.

(invited) **Speaker**, *UGA ACM*, "UGA ACM Machine Learning Workshop", University of Georgia, Athens, GA.
Materials

Poster, *CURO Symposium*, "Identification of Vaccine Misinformation Online", University of Georgia, Athens, GA.
J. Waring, **S. Quinn**

Poster, *Quantitative Bioimaging Conference*, "Large-scale Analysis of Spatiotemporal Organellar Network Evolution", Texas A&M, College Station, TX.
A. T. Loy, A. Courtney, B. Reaves, F. D. Quinn, S. C. Chennubhotla, **S. Quinn**

2016 **Poster**, *Molecular Parasitology Meeting*, "Calcium Signaling and Motility of Toxoplasma gondii", University of Chicago, Woods Hole, MA.
Voted "Best Poster"

Poster, *Southern Translational and Education Research (STaR) Conference*, "Mining Pre-Exposure Prophylaxis Trends in Social Media", University of Georgia, Athens, GA.

Speaker, *PyCon*, "Python for Public Health: Building Statistical Models of Ciliary Motion", Portland, OR.

Speaker, *International Conference on Biomedical and Health Informatics (BHI)*, "Dr. Twitter: The Logistics of Practical Disease Surveillance with Social Media", IEEE EMBS, Las Vegas, NV.

Speaker, *Spark Summit East*, "Scaling Unsupervised Ciliary Motion Analysis for Actionable Biomedical Insights with PySpark", New York, NY.

2015 **Speaker**, *IOB Big Data Challenges in Life Sciences*, "Unsupervised discovery and definition of latent ciliary beat patterns", University of Georgia, Athens, GA.

Poster, *Southern Translational and Education Research (STaR) Conference*, "Towards a Quantitative Definition of Ciliary Motion Phenotypes", University of Georgia, Athens, GA.

(invited) **Speaker**, *Biomedical Science and Engineering Conference*, "Advanced Computing Infrastructure for Biomedical Imaging", Oak Ridge National Laboratory, Oak Ridge, TN.

2014 **Poster**, *Proceedings of the 1st International Workshop on Odor Spaces*, "Categorical, low-dimensional decomposition of human odor space with non-negative matrix factorization", Flavour.

2011 **Speaker**, *ApacheCon NA*, "Dr. Mahout: Analyzing clinical data using scalable and distributed computing", Apache Software Foundation, Vancouver, BC.

Grants

2020/07–2023/06 **National Science Foundation**, *IGE: Toward an interdisciplinary blueprint for Open Science Graduate Education*, 1955049 ($499,449).
Dr. S. Quinn (PI, University of Georgia), Dr. K. Johnsen (co-PI, University of Georgia), Dr. M. Welch-Devine (co-PI, University of Georgia), Dr. D. Carter (co-PI, University of Georgia), Dr. N. Lazar (co-PI, University of Georgia).

2019/09–2021/08 **National Institutes of Health**, *Health Informatics to Model the Scott County HIV Outbreak*, 1R21DA047893-01A1 ($429,807).
Dr. T. Heckman (PI, University of Georgia), **Dr. S. Quinn** (Co-I, University of Georgia), Dr. Y. Shen (Co-I, University of Georgia), Dr. W. Tierney (Co-I, University of Georgia), Dr. J. Kelly (Key Personnel, Georgia Department of Health), Dr. A. Ramanathan (Key Personnel, Argonne National Laboratory).

2019/08–2024/07 **National Science Foundation**, *CAREER: ABI-Innovation: CiliaWeb: Integrated platform for foundational and reproducible ciliary beat pattern analysis*, 1845915 ($964,099).
Dr. S. Quinn (PI, University of Georgia).

2015/08–2019/07 **National Science Foundation**, *Collaborative Research ABI Innovation: Large-scale Analysis of Organellar Network Evolution*, 1458766 ($768,834).
Dr. C. Chennubhotla (PI, University of Pittsburgh), Dr. B. Reaves (Co-PI, University of Georgia), Dr. V. Starai (Co-PI, University of Georgia), **Dr. S. Quinn** (Co-PI, University of Georgia), and Dr. F. Quinn (Co-PI, University of Georgia).

2017/07–2018/06 **University of Georgia Research Foundation**, *Toward a holistic view of subcellular dynamics: building implicit models of cellular organelles*, FRG-RX064 ($9,829.00).
Dr. S. Quinn (PI, University of Georgia).

2016/07–2017/06 **University of Georgia Research Foundation**, *Distributed one-dimensional dictionary learning for fMRI signal reconstruction in large-scale brain imaging*, FRG-SE0044 ($8,804).
Dr. S. Quinn (PI, University of Georgia).

Patents

2016/11 **US Patent & Trademark Office**, *System and Method for Automated Identification of Abnormal Ciliary Motion*, Patent no. 9,483,685.
Dr. C. Chennubhotla, **Dr. S. Quinn**, Dr. J. Durkin, Dr. M. Zahid, Dr. R.J.B. Francis, Dr. C.W.Y. Lo

Scholarships & Awards

2019 **Outstanding Research Award**, *Department of Computer Science*, University of Georgia.
Annual departmental award, recognizing faculty who made outstanding research contributions in the past academic year.

2018 **Outstanding Teaching Award**, *Department of Computer Science*, University of Georgia.
Annual departmental award, recognizing faculty who made outstanding contributions to undergraduate and graduate education in the past academic year.

2017–2019 **Lilly Teaching Fellow**, *Center for Teaching and Learning*, University of Georgia.
Recognizes recent Ph.D. recipients for outstanding instructional promise, and provides opportunities for the Fellows to further develop skills in effective teaching methods and pedagogies.

2013 **JBS Authors' Choice Award**, *Society for Laboratory Automation and Screening*.
Reflects popularity among authors (citations) throughout 2012 on *Automated Image Analysis for High-Content Screening and Analysis*.

2011 **Best Student Presentation, Runner-Up**, *Oak Ridge National Laboratory*, Biomedical Science and Engineering Conference.
Recognizes student presenters who demonstrate commendable research according to content and substance.

2010 **Graduate Student Teaching Award**, *Carnegie Mellon University*, Department of Biology.
Annual Departmental award, recognizing one graduate student for outstanding mentorship and teaching.

Teaching Experience

2019 **Invited Guest Lecturer**, *STAT 8920 Statistical Research and Professional Practice I*, "Open Science: Theory and Practice", University of Georgia.
Materials

Invited Guest Lecturer, *GRSC 8550 Responsible Conduct of Research*, "Open Science: Theory and Practice", University of Georgia.
Materials

Invited Guest Lecturer, *Bridges to the Doctorate*, "Open Science: Theory and Practice", University of Georgia.
Materials

Invited Guest Lecturer, *GRSC 8550 Responsible Conduct of Research*, "Open Science: Theory and Practice", University of Georgia.
Materials

2018 **Invited Guest Lecturer**, *STAT 8920 Statistical Research and Professional Practice I*, "Open Science: Theory and Practice", University of Georgia.
Materials

2017- **Creator & Instructor**, *CSCI 4360/6360 Data Science II*, University of Georgia.
Fall 2017, **Fall 2019**.

2017- **Creator & Instructor**, *CBIO (CSCI) 4835/6835 Introduction to Computational Biology*, University of Georgia.
Spring 2017, **Fall 2018**, **Spring 2020**.

2016- **Creator & Instructor**, *CSCI 8360 Data Science Practicum*, University of Georgia.
Fall 2016, **Spring 2018**, **Spring 2019**

2016- **Creator & Instructor**, *CSCI 1360 Foundations of Informatics and Analytics*, University of Georgia.
Fall 2016.

2016- **Creator & Instructor**, *CSCI 1360E Foundations of Informatics and Analytics*, University of Georgia, Office of Online Learning.
Summer 2016, **Summer 2017**, **Summer 2018**.

2016 **Creator**, *CSCI 3360 Data Science I*, University of Georgia.

2015 **Creator & Instructor**, *CSCI 6900 Mining Massive Datasets*, University of Georgia.
Spring 2015, **Fall 2015**.

2013 **Invited Guest Lecturer**, *MSCBIO 2025 Introduction to Bioinformatics Programming in Python*, "Bioimage Analysis with OpenCV", University of Pittsburgh.

2012 **Invited Guest Lecturer**, *CS 15-319 Cloud Computing*, "Introduction to Apache Mahout", Carnegie Mellon University, Qatar.

Mentoring Experience

2019-2020 **Faculty Mentor**, *UGA Young Dawgs*, University of Georgia.
Krishi Kishore: rising high school senior. Public health surveillance and natural language processing.

2018 **Faculty Mentor**, *Population Biology of Infectious Diseases REU*, University of Georgia.
Brittany Dorsey: rising junior from Mercer University, majoring in Biology. Social network modeling of spatiotemporal changes in diffuse subcellular mitochondrial patterns.

2018– **Faculty Supervisor**, *Deep Learning @ UGA (DELUG)*, University of Georgia.

2017-2018 **Faculty Mentor**, *UGA Women in Science (WiSci)*, University of Georgia.

2016-2018 **Faculty Supervisor**, *UGA ACM Organization*, University of Georgia.

2016-2017 **Faculty Mentor**, *UGA Young Dawgs*, University of Georgia.
Geoffrey Mon: deep learning and open source development, 1 conference publication, accepted to B.S. Computer Science program at Princeton.

2015 **Faculty Mentor**, *Fungal Genomics and Computational Biology REU*, University of Georgia.
Chinasa Okolo: rising sophomore from Pomona College, majoring in Computer Science. Social network modeling of spatiotemporal changes in diffuse subcellular mitochondrial patterns.

Memberships and Committees

2019 **Panel Reviewer**, *National Science Foundation*.
2018-2020 **Program Committee**, *IEEE BigData*, IEEE BigData Conference, IEEE.
2018, 2020– **Chair, Research Track**, *Southern Data Science Conference*.
2018 **Technical Program Committee**, *PASC 2018*, PASC Conference.
2017 **Program Committee**, *ISMB / ECCB*.
2017 **Program Committee**, *ICDCS*, IEEE International Conference on Distributed Computing.
2017 **Program Committee**, *DEEM Workshop*, Data Management for End-to-End Machine Learning, SIGMOD / PODS 2017 Conference.
2016-2020 **Chair & Organizer**, *IEEE BigData*, Open Science in Big Data (OSBD) Workshop, IEEE.
2016-2020 **Member**, *IEEE*.
2016-2019 **Area Chair**, *IEEE CLOUD*, Data Analytics in the Cloud.
2016-2019 **Program Committee**, *IEEE BigData Congress*.
2016– **Reviewer**, *Georgia Junior Science & Humanities Symposium (GJSHS)*.
2014 **Ad-hoc reviewer**, *PLOS ONE*.
2011– **Committer**, *Apache Software Foundation*, Apache Mahout.

Affiliations

Department of Computer Science, *(CSCI)*.
Department of Cellular Biology, *(CBIO)*.
Institute of Artificial Intelligence, *(IAI)*.
Integrated Life Sciences, *(ILS)*.
Institute of Bioinformatics, *(IOB)*.
Interdisciplinary Disease Ecology Across Scales, *(IDEAS)*.
Georgia Informatics Institute, *(GII)*.
Center for the Ecology of Infectious Diseases, *(CEID)*.
Phenomics and Plant Robotics Center, *(P2RC)*.

Industry Experience

2013 **Oak Ridge National Laboratory**, *Subcontractor*, Oak Ridge, TN.
Helped design and implement earliest components of ORBiT, the Oak Ridge Biosurveillance Toolkit. Mentored and supervised two undergraduate interns in the integration of the Titan and Hive distributed data systems, and the pipeline design of multimodal data integration and analysis. Developed a web-based front-end for querying and searching three CMS databases linked by Neo4j entities.

2011 **Google**, *Engineering Intern*, Pittsburgh, PA.
Created a large-scale evaluation framework for advertisement forecasting server with the AdSense team. Computed metrics to determine quality of ads selected over time and minimize prediction error by the forecasting server.

2010 **Google Summer of Code**, *Apache Mahout Project*.
Implemented spectral clustering and iterative hierarchical graph cuts clustering algorithms on the MapReduce-based Mahout framework for large-scale unsupervised machine learning as part of the Google Summer of Code program.

2009 **IBM**, *ExtremeBlue Technical Intern*, Raleigh, NC.
Worked with a team of four interns to deploy the corporate filesharing program on smartphones. Implemented a "smart" landing page with filesharing suggestions using previous behavior. Helped integrate corporate instant messenger into the web interface of the filesharing application.